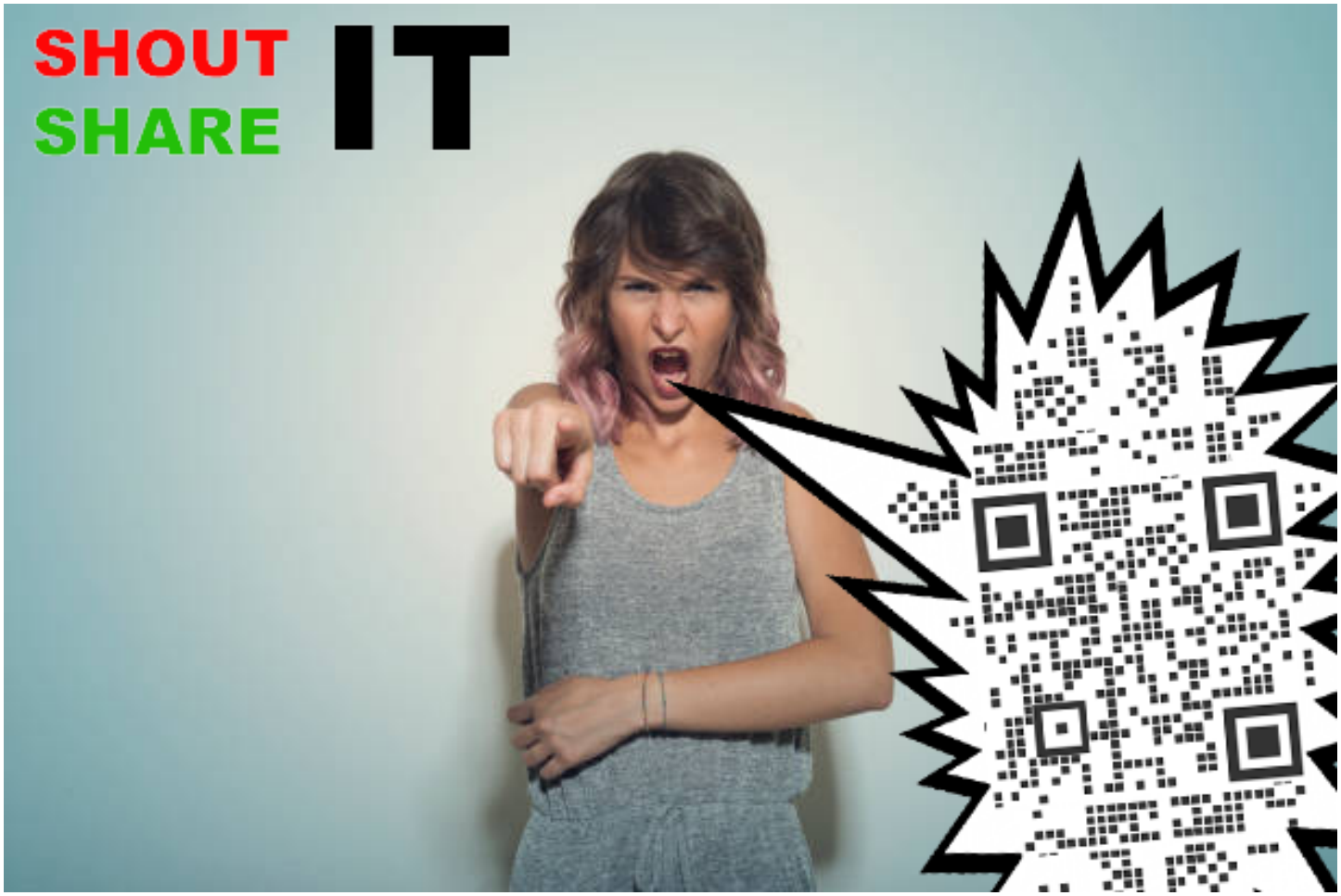
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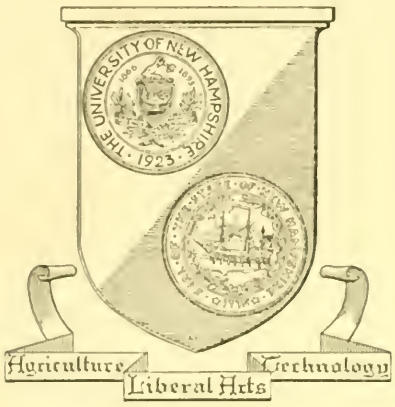

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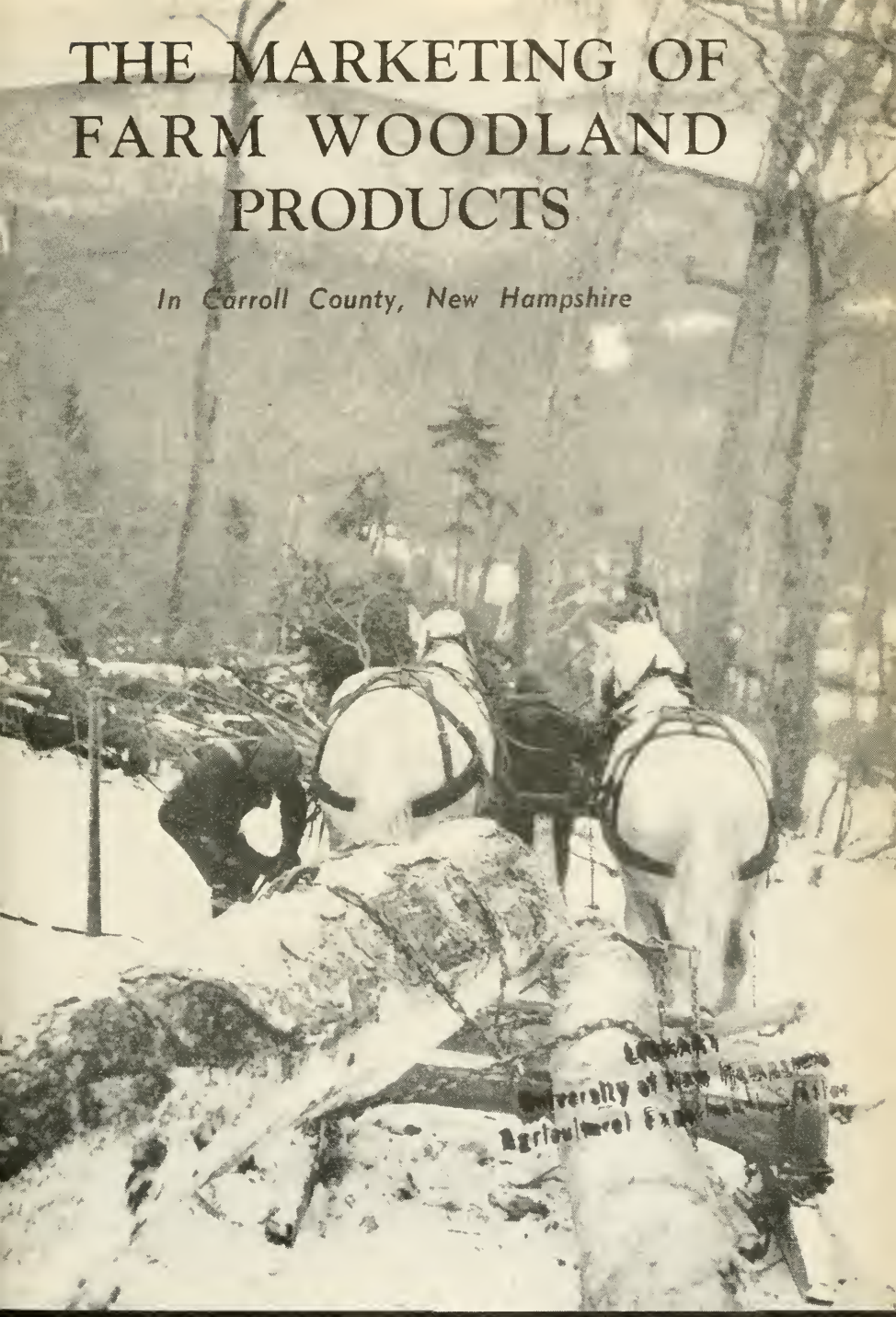
THE MARKETING OF FARM WOODLAND PRODUCTS

In Carroll County, New Hampshire



By ALAN MacLEOD *and* JOHN CHANDLER
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Cover photograph courtesy of White Mountain National Forest.

The Marketing of Farm Woodland Products

In Carroll County, New Hampshire

By Alan MacLeod *and* John Chandler

Introduction

THROUGHOUT New Hampshire, farm woodlands supply an important part of farm income. Consequently, any methods by which revenue from forest products can be increased should be of value to farmers in all sections of the state.

While this study is confined to a section of Carroll county, its findings are applicable to many other parts of northern New England. The approach is economic. Production is compared with consumption. Conclusions are expressed in economic terms and should point the way by which marketing efficiency can be increased with benefit to all who have forest products to sell.

The Problem

Customary methods of marketing farm forest products have often been criticized as inefficient and expensive. Instances are cited of such excessive handling that little of the sales price is left for the producer.

To learn the facts regarding efficiency in marketing it is necessary to investigate transportation facilities and charges to present market outlets and to determine whether these outlets, if supplied efficiently, could make most economical use of forest products, or whether opportunity for other outlets exists. It is also necessary to investigate opportunities for cooperative action, both in production and marketing.

These problems are made more difficult because research in forest economics has been limited. Commenting upon the situation in 1936, the Social Science Research Council said: "Considering the important place that forest land, forest materials, and forest industries occupy in our national economy, and considering also the diversity and complexity of the

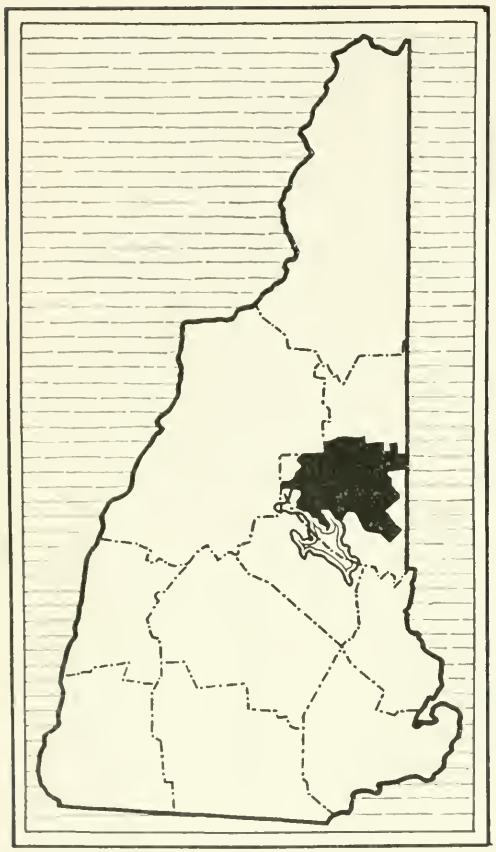

Fig. I.—Outline map of New Hampshire. The black section indicates the area studied.

problems, the relatively small amount of attention that has been given to forest economics research is striking."[1]

Most of the research in this field has been confined to the collection of statistics on distribution and the compilation of lists of wood-using plants. To the usual problems of a study, therefore, there has been added the selection and development of a proper technique.

Scope of Study

The survey was conducted in an area comprising a large portion of Carroll county with Tamworth as the center. (See Fig. I.) Each timber owner or operator supplied information which was recorded upon a questionnaire.[2]

Most of the field work was completed by October, 1938, except for obtaining estimates of hurricane damage and deliveries of timber up to July 1, 1939.

Methods of Securing Supply Information

The estimates of merchantable timber[3] (sawlogs) were obtained in several ways. When a previous appraisal based on a cruise by a trained forester or a reconnaissance by a competent individual was available, it was accepted (after adjusting for later growth and cut). Such estimates were obtained for most of the large tracts and many of the woodlands owned by summer residents.

[1]Social Science Research Council: A Survey of Research in Forest Economics, Bulletin No. 21, 1936.

[2]Data obtained for the area included the following:

1. Quantity and quality of merchantable timber.
2. Acreage of forest land.
3. Quantities of forest products cut for sale or home consumption (where estimates were available).
4. Amounts of various forest products taken by present market outlets within an economical range of the area of supply.
5. Prices at which forest products from the area have been marketed in recent years.
6. Transportation charges from roadside to mill and from mill to final wood-working industry.
7. Interest in attempts to improve marketing conditions.

[3]In determining merchantability of timber many factors such as type of ownership, size of tract, volume per acre, quality, nature of product, accessibility to roads, and distance from mill were given consideration. Primarily this study has to do with the marketing of sawlogs and specialty products; estimates, therefore, are in terms of board feet to the minimum diameter usually acceptable in the region.

On White Mountain National Forest land definite cruise data were available by compartments, and those falling within the area were taken. The New Hampshire State Forestry Department supplied information for its properties.

Wherever such expert estimates were not to be secured, the owner's figure was taken, or if he were not available, his representative or some other person having a knowledge of the property was consulted. Estimates obtained in this way were checked by a trained forester who actually went over the woodland.

Information regarding quantity and quality of merchantable timber was secured from town officials or others familiar with the area and proved useful as a check on the data already obtained.

Base maps used in making this survey were enlargements (scale two inches to the mile) of topographical sheets showing roads, railroads, bodies of water, and town lines. On these were located houses and the residents' names. These maps were taken into the field and as individuals were interviewed, the approximate boundaries of their woodland were sketched, numbers assigned them, and a schedule of information was keyed to the map. Upon completion of the survey, all areas upon which there was any appreciable amount of merchantable timber were indicated so that the area upon which estimates were secured was clearly defined.

The purpose for which the data were to be used governed the selection of methods. While accuracy within certain limits was held desirable, the variations introduced by vagaries of weather, cutting of timber, and other such unpredictable factors make the most detailed estimate subject to a large probable error. For the purposes of this study a figure correct within a considerable range would be as useful as one accurate to the last thousand feet.

Methods of Securing Information on Transportation Charges

Several sources were used in obtaining estimates of trucking charges. Because much of the work is done by truckmen making a business of hauling, there is a tendency for trucking charges to be relatively uniform and definite in a given area. Typical hauling charges were available in the New Hampshire Forest Market Report[1] and these were supplemented with information secured by personal interviews with haulers operating in the area. In addition to these data some facts were secured regarding the costs of transporting logs and lumber. Most of these figures were supplied by the White Mountain National Forest and served as a useful check upon charges.

Methods of Securing Consumption and Price Information

Several sources of information on demand conditions were used: the survey conducted by George M. Hopkins[2]; the New Hampshire forest market reports[3]; surveys made by the Carroll county agent, aided by farmers; data from the White Mountain National Forest regarding wood-using industries in that section; and personal interviews with those fa-

[1]Barraclough, K. E., New Hampshire Forest Market Report, Fall, 1937. New Hampshire Extension Circular 204, 1937.

[2]Hopkins, George M., Marketing Forest Products in New Hampshire, New Hampshire State Planning and Development Commission, 1938. Mr. Hopkins kindly supplied detailed information for plants located within an economical range of the area.

[3]Barraclough, K. E., New Hampshire Forest Market Reports, 1935 to 1938.

miliar with the wood-using industries drawing upon the area. Many of the larger outlets for forest products of the section supplied facts regarding their plant capacities and usual demand.

A portion of the questionnaire used in this study referred to prices received for timber sold. In many cases, owners had records of prices received for sales in past years, but with few exceptions these did not extend back of 1915. Accuracy tended to increase with proximity to the present.

Description of the Area

Before proceeding with the analytical sections of the survey, a description of the area is necessary. For greater clarity this is presented in three parts: woodland, agriculture, and market outlets.

Woodland

The area is located in the southern part of Carroll county and includes the towns of Tamworth, Ossipee, Madison, Eaton, and parts of Sandwich, Moultonboro, Freedom, Effingham, Albany, and Tuftonboro. (See Fig. II).

Limits of the area were chosen to secure as nearly as possible a natural working circle from which practically all products move into the same general markets. Natural boundaries such as mountain ranges and large bodies of water served in many cases to set the limits. Especially on the west, south, and much of the north was this true. The character of the woodland in the east made the exact location of this boundary of minor consequence and in general the state line was taken as the limit.

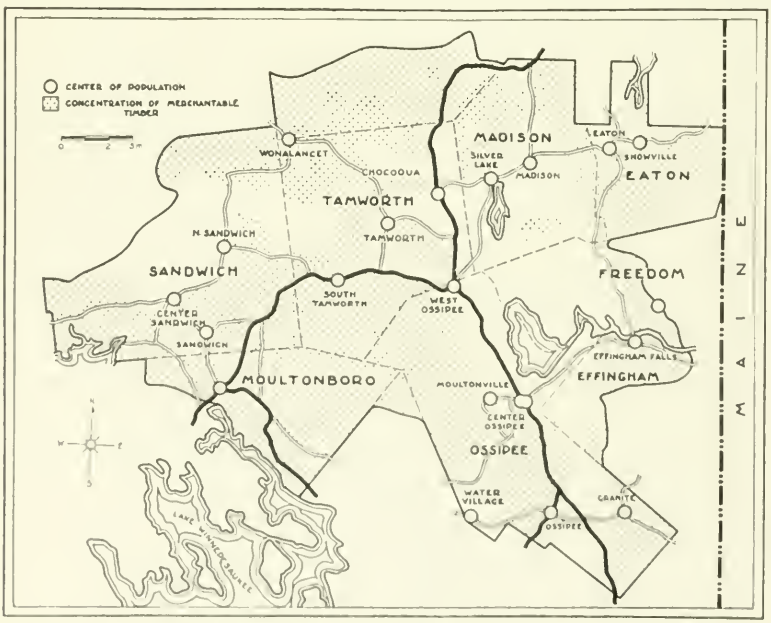

Fig. II.—Map of the area studied, showing concentration of timber, centers of population, and principal roads.

View in northern part of area.

Topography varies from level areas in the Ossipee plains to the rugged Sandwich and Ossipee Ranges. Lakes, ponds, and streams are plentiful.

Three cover types were recognized: pine, hardwood, and softwood other than pine. Hardwoods predominate with stands of spruce and fir at the higher elevations and pine in the valleys, particularly on abandoned farm and pasture land.

The quality of the site[1] is, in general, good. There are, however, exceptions, the most notable of which are the higher ridges and the plains in the towns of Ossipee and Madison. On the higher ridges the soil is too thin to support merchantable growth, the cover at present consisting of spruce, fir, and white birch. Repeated fires following cutting have materially reduced the productivity of the plains until now the cover consists mainly of pitch and red pine of inferior quality, scrub oak, and grey birch.

Agriculture

Agriculture in the area does not revolve around any one commodity. Farms tend to be small and production diversified. Because of the importance of both summer and winter recreational activities, with consequent increase of population at certain seasons of the year, a local demand for many farm products has developed. Summer dairying and production of fresh fruits and vegetables, employment supplied by summer residents, and work in the woods in the winter have been largely responsible for the survival of agriculture in this section of the state.

The area falls into the division termed "highland farming."[2] Concerning this general classification the following statements are made: "A large majority of the farms are of a general and subsistence nature. The lands are predominantly non-agricultural, the crop lands being thin, stony, and hilly, and generally cannot be made productive except at prohibitive costs." This description applies to the whole area, with the exception of a relatively small number of productive farms located for the most part in the valleys.

[1]The term "site" is used in forestry to mean the inherent crop-producing power of forest land.
[2]Grinnell, H. C., Type-of-Farming Areas in New Hampshire, New Hampshire Agricultural Experiment Station Circular 53, 1937.

Because of the limited opportunities for securing satisfactory returns from other farm products, the income from the farm woodlot assumes great importance. A considerable part of the land is in timber and a considerable part of the farmer's labor is free to be spent in the woods.

Market Outlets

Various surveys provide the basis for a description of the major wood-using industries drawing upon the area. These may be grouped according to those located within the area and those situated outside its boundaries. The rapidity with which portable mills can be shifted from place to place tends to render any estimates of their demands untrustworthy. This must be taken into consideration in interpreting the following paragraphs.

The most recent survey[1] lists stationary and portable sawmills producing box boards and higher grade lumber as the most important wood-using industry, with pine, spruce, and hemlock as the species most in demand.

In addition to these, there are within the area a number of outlets for certain species for specialized uses such as furniture, turnings, screens, blinds, and cabinet work. Paper and yellow birch, sugar maple, white ash, and white pine are in demand for these markets.

Many of the makers of specialty products do not buy directly from woodland owners but purchase their raw materials in a semi-manufactured state. In estimating total outlets for forest products in the area, this must be kept in mind to avoid the error of double counting.

Another group of industries which customarily purchases a part of its supply of raw material within the area is located outside its boundaries. These industries are engaged in the manufacture of paper, excelsior, wood heels, shoe pegs, poles, posts, ties, piling, and various novelties. These markets offer outlets for a range of species and grades varying all the way from high quality paper birch for shoe pegs to aspen and low grade pine for excelsior.

Production

Before any of the objectives of this study, such as that of determining means of increasing the efficiency of marketing the products from farm woodlands, can be carried out, it is necessary to have some information on the amount of timber available in the area studied and production on a sustained yield basis.

Merchantable Timber by Species and Types

Because of the many specialized outlets, it seemed advisable to attempt to estimate not only the merchantable pine, spruce, hemlock, and hardwood, but to subdivide the hardwoods into paper birch, sugar maple, white ash, and other specialty products. Cordwood was of minor importance because of the limited outlets and tremendous quantity available. Where estimates were to be had they were taken, but no attempt at a complete survey of cordwood was made. Pulpwood being of greater potential interest as a merchantable product was estimated in more detail, but in this case, too, data are far from complete and serve largely to indicate the existence of commercial quantities of this product.

[1]Hopkins, G. M., opus cit.

The acreage of each tract of merchantable timber was classified according to type and quality[1]. Estimates in board feet were made by species for the softwoods and grouped for the hardwoods. From the standpoint of our study, it seemed that this information would form an important part of any supply analysis and would be of as much significance as more complete figures for the total woodland acreage.

The total woodland acreage for the area is 223,424 of which 51,827 acres are merchantable and 171,597 unmerchantable. Were it possible to predict with any degree of accuracy future trends of important economic factors, much more detailed information would undoubtedly be of value.

Courtesy of White Mountain National Forest.

Good stand of young hardwood from which poor quality material has been removed for fuelwood. Species remaining are paper birch, white ash and sugar maple.

During the period previous to 1920, in which the greatest logging activity occurred, stands were greatly depleted, but since that time much of the demand for lumber has been met by shipments from outside New England, thus reducing the demand upon local woodlands.

A few areas of softwood which were marketable during the period of exploitation but which were not cut, now contain many individual trees badly in need of removal. This is especially true of some pine stands.

Many acres cut over some years ago and not of merchantable age when market conditions were good are now at a point where partial cut-

[1]Quality standards were:

Good—One and one-half 16-foot logs or more, fairly free from limbs and defects.
Fair—One to one and one-half logs, not over 35 per cent defective.
Poor—Over 35 per cent defective, scrubby, or otherwise of poor quality.
The following minimum diameters at breast height were adhered to:

1. Spruce, fir, aspen, white pine—5.0 inches.
2. Hemlock, paper birch, white ash—7.0 inches.
3. All other species (maple, beech, yellow birch, oak, etc.) —9.0 inches.

tings could be made. This group contains most of the good quality lumber.

The hardwoods of marketable size are mostly of poor quality, suitable only for cordwood. This condition has resulted largely from repeated cuttings which have removed the better trees and opened up stands making for large-topped, short-boled residuals. Because beech has often been discriminated against, occasional good stands occur.

The quality and quantity of merchantable timber standing in the area are indicated in Table 1.[1]

Table 1.—*Acreage, quantity, and quality of timber merchantable as saw-logs in the area, by types, 1939*

Type	Good quality		Fair quality		Total	
	Acres	M bd. ft.	Acres	M bd. ft.	Acres	M bd. ft.
Pine	8,367	55,898	5,209	39,291	13,576	95,189
Other softw'd	1,237	62,846	6,038	40,653	7,275	103,499
Hardwood	6,844	19,423	24,132	42,228	30,976	61,651
Total	16,448	138,167	35,379	122,172	51,827	260,339

For the area as a whole merchantable stands of pine approximate 7,000 board feet per acre, and of hardwood 2,000 board feet per acre. Because much of the spruce is mixed with hardwood, no estimates of average stand per acre of this species can be made.

No attempt was made to type mixed stands as such, but if over 50 per cent of the total volume was softwood it was so classified; otherwise it appears as hardwood acreage. Most of the pine is in the valleys, while the hardwood is scattered throughout the entire area except on the high ridges.

Most of the stands are readily accessible for logging and repeated cuttings have materially reduced the growing stock. An exception to this statement must be made in the case of "good" softwood (of which approximately 80 percent is spruce). These stands are back in the mountains in less accessible locations and have largely escaped the repeated cuttings suffered by the rest of the area.

In addition to the figures given in Table 1, some eight million board feet of definitely poor quality pine covering about 2,250 acres should be included in the total quantity figure. Though probably not merchantable at the present time, a marked increase in demand might alter the situation making this quantity of more importance as the length of period under consideration increases.

A further division of the estimates of merchantable timber to show the amount available for special uses is presented in Table 2. Because of the character of the market, only high quality material has been included.

As stated previously, no attempt at a complete estimate of cordwood and pulpwood was made. Incomplete estimates suggest, however, that there are very large quantities of cordwood and sizable amounts of softwood and hardwood suitable for pulp.

[1]While most of the field work was completed before the hurricane of September, 1938, adjustments for blowdown have been made and estimates presented in this report apply to timber standing in the summer of 1939. Fortunately, the hurricane caused much less damage in the area covered by this study than in other sections of the state.

TABLE 2.—*Quantity and quality of merchantable timber available for specialty products, by species, 1939*

Species	Good quality	Fair quality	Total
	Cords	Cords	Cords
Paper birch	4,722	19,055	23,777
Sugar maple	1,695	4,643	6,338
White ash	1,710	51	1,761
Other	1,274	177	1,451
Total	9,401	23,926	33,327

Production on Sustained Yield Basis

Any efficient processing and marketing organization to handle forest products would (to avoid long periods of idleness and to use plant, equipment, and personnel to best advantage) require a relatively constant supply of raw material.

In order to accomplish this objective some long range planning for forest management is essential. This does not mean intensive management on each individual tract but rather a plan for sustaining the yield over the area as a whole. Much of the timberland included in the survey is farm woodland and is in units the boundaries of which are set by other than economic factors. Any plan for sustained yield devised for the area should consider the farm woodlands in the light of the remainder of the farm business with the ultimate goal a combination of enterprises, including timber production, which is likely to give the individual the greatest annual net income.

By approaching the problem from this angle, varying degrees of intensity of management will exist on individual tracts, but for the area as a whole it will be possible to maintain a fairly uniform annual cut. The underlying feature of the whole management plan should be a well coordinated program of land use.

It is necessary to have an estimate of the amount of merchantable timber which can be removed annually without impairing growing stock or reducing the supply left standing. Total production (providing an attempt is made to keep supply resources somewhat constant) over an intermediate period (say 2-25 years) is relatively fixed[1]. In other words, the producer, although he may be able to increase growth rates by cultural methods, will be unable to influence greatly the amount of timber

[1]Under conditions of sustained yield the amount of timber which can be put on the market from an area may vary greatly depending on the length of the period under consideration.

1. For any time up to a few months, production is relatively fixed. (The process from stump to stick ordinarily takes some little time.)
2. During the space of a year or two, the amount made available may vary considerably. The extent of such variation depends to a considerable extent on the size of the area; the smaller the area relative to the whole woodland, the greater opportunity there is for variation.
3. Over an intermediate period of years (say 2-25) the amount again becomes relatively fixed. Forest management practices can have little effect upon production of timber ready for cutting within the period.
4. Over a long period, quantity comes under the influence of the timber owner. By adopting (or failing to adopt) various management practices, yields may be made to vary over a wide range.

Throughout this study, only that quantity becoming available over the third, or intermediate, period is considered.

becoming available within this period. This quantity depends largely on the merchantable timber standing at the beginning of the period, the growth rate of the particular species present, the site, and to a very small extent the management practices followed.

Such an estimate of production can be made by applying Von Mantel's formula $\left\{ \text{annual cut} = \frac{\text{actual growing stock}}{\frac{1}{2} \text{ rotation}} \right\}$ to the total merchantable volume of the existing growing stock. The annual cut so calculated tends to be conservative when a long rotation is used.

By applying the above method and using a rotation period of 120 years for all species except pine and paper birch which would have rotation periods of 80 years, the annual cut for the area surveyed on a sustained yield basis is shown in Table 3.

Table 3.—*Annual cut on sustained yield basis for the area surveyed, by types*

Type	Good quality	Fair quality	Total
	M bd. ft.	M bd. ft.	M bd. ft.
Pine	1,397	982	2,379
Other softwood	1,047	678	1,725
Hardwood	343	783	1,126
Total	2,787	2,443	5,230

This table indicates that approximately five million board feet can be taken from the area each year without depleting the foundation stock.

In making the division between good and fair, it is assumed that in the relatively short period under consideration, new management practices instituted at present would not greatly affect the quality of timber harvested.

Therefore, it is probable, provided the annual cut is properly distributed, that the quality harvested each year might be expected to be roughly in the same ratios as indicated in Table 1.

Courtesy of White Mt. Nat. Forest

Tractor logging in a lowland softwood area.

Data presented in the preceding section are summary and include all anticipated growth in the area studied. The picture is not complete without some information on what proportion of the total annual growth takes place on tracts accessible for logging operations and under the control of persons willing to dispose of woodland products. A factor which sometimes tends to limit the supply available in a given year is the shortage of logging equipment such as teams and tractors.

Though many object to clear cutting, most woodland owners are willing to sell logs from their holdings providing they are assured the reproductive and recreational aspects of the woodland will not suffer. There are a few tracts, however, where no consideration appears likely to influence the owner to market timber. Included in this classification are some of the purely recreational areas owned by governmental agencies and holdings of a small number of individuals. By eliminating from consideration tracts listed as inaccessible and those from which no sales can be expected within the near future, and estimating annual cut on a sustained yield basis, net figures for available supply are obtained. (See Table 4).

TABLE 4.—*Annual cut of timber accessible and available for sale, on sustained yield basis, by types*

Type	Good quality	Fair quality	Total
	M bd. ft.	M bd. ft.	M bd. ft.
Pine	1,366	942	2,308
Other softwood	1,018	669	1,687
Hardwood	332	779	1,111
Paper birch[1]	59	238	297
Total	2,716	2,390	5,106

[1]Included in hardwood

The extent to which there is equipment available is important in the consideration of a cooperative enterprise. The experience of the past year in timber salvage work indicates that when markets warrant, large quantities of both labor and equipment for logging can be secured from outside the area. Consequently, the consideration of equipment will be left to a later section on cooperative marketing of forest products.

Marketing

Before possibilities for the future can be analyzed, consideration must be given to consumption, prices paid, and transportation of forest products. These, together with related topics, are discussed in the next four sections.

Consumption of Forest Products

Throughout the following discussion certain qualifications must be kept in mind. First of all, a period intermediate in length during which average annual cut is regulated on a sustained yield basis is assumed. Secondly, estimates both of annual cut and annual amount processed are average figures and do not pertain to any particular year. Obviously, were either of these assumptions violated a comparison of such figures would be of little value. A third qualification to be kept in mind is that in much of the discussion the area under study is treated as though it were an isolated region affected only imperceptibly by changing market conditions elsewhere. This is, of course, not the case. Conclusions derived from such over-simplified assumptions must be modified in line with actuality.

Estimates of production were obtained on an annual basis, and to assure comparability it is desirable to present estimates of consumption in the same manner.

Any comprehensive discussion of demand must consider both the quantity and quality of the product demanded. Each wood-using industry has certain specifications as to grade of log desired and quality below which it will not purchase. In obtaining an estimate of consumption, consideration has been given to this quality factor.

For many wood-using plants the amount of raw material used during any particular year will not be an accurate measure of effective plant capacity. By "effective plant capacity" is meant that capacity which is attainable under the practical operating conditions which exist.[1] To obtain the estimates presented in Table 5, all available data were utilized and were supplemented with an examination of each plant. Such factors as efficiency of set-up, obsolescence of machinery, and any other factors which might limit the output were considered.

Table 5.—*Typical[1] annual cut and effective capacity of stationary and portable mills operating within the area*

	Stationary	Portable	Total
	M bd. ft.	M bd. ft.	M bd. ft.
Cut			
Pine	1,570	1,950	3,520
Other softwood	1,475	425	1,900
Hardwood	450	175	625
Paper birch[2]	100	50	150
Total	3,495	2,550	6,045
Effective Capacity[3]	13,250	9,000	22,250

[1]Based on annual cut for past six years.
[2]Included in hardwood.
[3]As of 1938.

For products such as low-grade saw timber, the area from which it is economical to haul logs is relatively limited because of the tendency of transportation costs to exceed value of the raw material. The situation is very different, however, when dealing with products of high value. In a later section dealing with transportation this whole question of the distance of economical haul of various products is discussed in some detail. In preparing Table 5 the policy has been to include wood-using plants located within the area or within economical hauling distance. Sales of small quantities of such products as high-quality ash, sugar maple, paper birch, etc., to industries located outside the area have been included in the table.

Sales of pulpwood, excelsior wood, and cordwood are not included in this table. Because pulp mills have been located at too great distances from the area, they have not offered markets sufficiently attractive to bring forth an appreciable amount of pulpwood.

[1]This concept is used in the Brookings Institution study: America's Capacity to Produce, p. 27, 1934.

The situation is somewhat different for excelsior wood. One plant with an annual consumption approximating 3000 cords of aspen draws a part of its supply from the area and because of its location would undoubtedly purchase all of this product available. Yearly fluctuations in the amount bought have been so great as to make any typical estimate impracticable. Cordwood does not come within the scope of this study and therefore is not included. The very character of the woodlands suggests that there would be sufficient cordwood to meet any demand situation likely to exist.

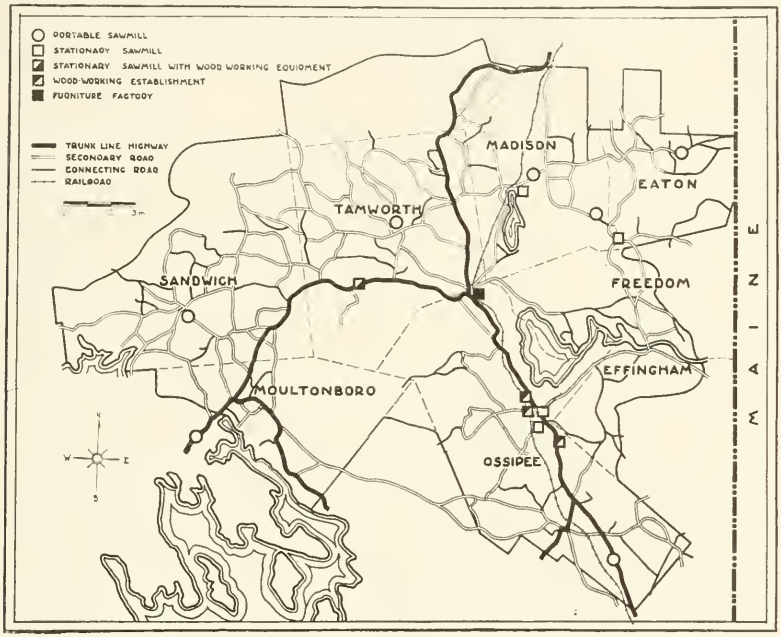

FIG. III.—Map of the area studied showing location of wood-using industries and transportation systems.

The location of the wood-using industries and transportation routes in the area are shown in Figure III. Two general types of plants are recognized: first, stationary sawmills, and second, portable sawmills. In this second category a distinction has been made between sawmills, sawmills with wood-working equipment, wood-working establishments, and furniture factories.

Prices Paid for Forest Products

The securing of comprehensive and reliable price data presented many difficulties. Complications were introduced by the range of qualities, both from the standpoint of a particular species and from the nature of the use of the wood. There are many different methods of sale of forest products in the area, but few attempts have been made to sell by grade. Forest products are sold at different stages of processing and unless care is taken in recognizing these stages, the data will not be comparable.

Table 6.—*Typical range of prices paid for stumpage, by species, 1930-38*

Species	Stumpage price per M bd. ft.
	Dollars
Pine	3.00—5.50
Spruce	3.75—5.75
Hemlock	3.00—4.25
Hardwood	1.50—5.00

Though an attempt was made to secure a reliable series of stumpage prices in the area, available data, both published and unpublished, did not lend themselves to price analysis. However, as an indication of recent prices, Table 6 is presented.

The range in prices shown in Table 6 can be accounted for largely by differences in quality, accessibility, bargaining power, and price movements over the period.

While an attempt has been made to make these data apply to woodlands of similar accessibility and quality, this is difficult because at any time there is some woodland which, because of its location or because of the character of its growing stock, has a stumpage value of zero. This comes about because the stumpage price is ordinarily a residual price calculated from the price of the logs delivered at the mill, less cost of fitting and transportation. Obviously, after a certain distance has to be traveled for a certain quality log, a margin is reached at which nothing will be available for stumpage.

The effects of bargaining power on price are difficult to evaluate. Because many sellers are dealing with a few buyers, there is a tendency for a buyers' market to exist. To the extent that this condition is present, price will tend to be lower than the competitive level.

All available information indicates that most woodland owners have a reservation price below which they will not sell. For the majority of owners these prices have been $2.50 per thousand board feet for white pine, $3.00 for spruce, $2.00 for hemlock, and $1.50 for hardwood.

Table 7.—*Prices of logs delivered at the mill, 1924-39*[1]

Date	White Pine Price per M bd. ft.	Paper birch Price per Cord	Date	White Pine Price per M bd. ft.	Paper birch Price per Cord
	Dollars	Dollars		Dollars	Dollars
1924	18.00	No data	1932	10.00	8.00
1925	18.00	No data	1933	10.00	8.00
1926	19.00	No data	1934	10.00	8.50
1927	20.00	No data	1935	10.00	8.85
1928	18.00	No data	1936	10.00	10.50
1929	17.00	No data	1937	11.25	9.00
1930	17.00	10.00	1938	10.00	9.00
1931	12.00	8.00	1939	11.00	9.00

[1]Prices refer to white pine delivered at Rochester, New Hampshire, and paper birch delivered at Fryeburg, Maine. In order to secure a continuous series over the period it was necessary to go outside the area for price records. Comparisons for particular years indicate that these prices are comparable with those paid within the area.

Prices paid for logs of similar quality delivered at a particular mill are presented in Table 7. It shows in a general way changes in recent years in the cost of raw materials to processors of forest products.

Many factors have been important in the determination of these prices. Competition from lumber imported from other regions certainly has had some effect. However, due to its higher quality because of superior manufacture and grading, this lumber has been used to satisfy a demand which the local product, as marketed, could not fill, and so this factor can be discounted to some extent.

The boxboard market has been of more importance. Because of methods of manufacture and character of growing stock, much of the local product has found this its only outlet. Therefore, local mills have had to base their quotations on market prices for boxboards. At the present time, however, there is a trend away from the production of boxboards which coincides with the increasing proportion of the annual output handled by stationary mills and the installation of more efficient processing machinery. Any lack of correlation between log prices and boxboard prices can be largely explained by this new trend in production, producers' lack of familiarity with market conditions, and the balance of bargaining power.

During the past few months and probably over the next year or so, policies of the Timber Salvage Administration may have an important influence on prices of timber in the area.

Table 8 outlines prices paid by this organization for logs delivered at storage points or mill sites. These prices should be on a comparable basis with those paid for logs at the mill.

TABLE 8.—*Prices paid by the Northeastern Timber Salvage Administration for specified grades of logs at delivery points, 1938-39*

Species and grade[1]	Price per M board feet for logs delivered[2] Scheduled	Advance
Pine	Dollars	Dollars
1	18.00	16.20
2	14.00	12.60
3	12.00	10.80
Hemlock	12.00	10.80
Spruce	14.00	12.60
Beech and White Birch		
1	20.00	18.00
2	14.00	12.60
3	10.00	9.00
Other Hardwoods		
1	22.00	19.80
2	16.00	14.40
3	12.00	10.80

[1]For a complete definition of grades see New Hampshire Forest Market Report, Winter 1938-39, New Hampshire Extension Service, Extension Circular 219, pp. 5-11.

[2]On basis of 90 per cent contract. The difference between the scheduled and advance price will be paid to the seller either partially or entirely provided that the final sale of logs and lumber results in a sufficient excess over the cost of administration.

Because of the grades involved, it is not possible to make any accurate comparison between these prices and those which have prevailed in the past.

Transportation of Forest Products

Wherever a commodity like forest products has both bulk and low value, transportation charges become important. When value is low, transportation charges on a relatively short haul may offset the price paid at the mill for the product. Thus for economical transportation, low-value logs can be shipped only short distances—the lower the value of the logs the shorter the haul.

Transportation charges for sawlogs do not vary appreciably with value of the product, but depend largely upon volume and weight. Therefore, it becomes economically possible to transport high-quality, high-value logs much greater distances than low-quality, low-value logs. Accordingly, industries which are located at great distances from the supply area have been considered as part of the demand picture; but only if those industries were in the habit of purchasing high-value products. For low-grade timber we have included only those industries within, or lying very close to, the area.

A portable mill. The truck shown here is of the type most commonly used for transporting logs and lumber in the area.

Because much of the hauling is done by regular truckmen and charges are relatively uniform it has been possible to summarize them in Table 9. Unlike milk trucking charges in many sections, forest products rates tend to vary with distance. Table 9 pertains to rough logs and refers to the hauling charge for picking up the log from the side of the road and transporting it to the mill.

Table 9.—*Charges for trucking logs various distances, 1938*

Distance Trucked	Charge per M bd. ft.
Miles	Dollars
Under 2	1.00—1.50
2—5	1.50—2.00
6—10	2.00—2.75
Over 10	2.50 and up

Another set of trucking charges applies to trucking sawed lumber. Because of reduction in bulk and elimination of weight, it becomes economical after a certain distance is reached to saw the logs and transport the sawed product, rather than to locate a mill at a greater distance from the raw material and transport round logs. Discussing this matter, H. H. Chapman comments: "The reduction of weight in the products of green logs, due to waste in manufacture and the effect of seasoning, approximates roughly an average of 50 per cent for all species. This is equivalent to an equal reduction in freight charges."[1]

Data secured from within the area suggest that the reduction in transportation costs by processing may not be as great as 50 per cent, but that it probably exceeds 35 per cent of the cost of hauling logs.

Relation of Production to Market Outlets

Having considered separately the annual growth of merchantable timber and the average annual cut in recent years in the area, it is now desirable to bring these two together. Throughout the following discussion it should be remembered that production is estimated on the basis of sustained yield. This consideration does not take into account such unforeseen and unpredictable happenings as the 1938 hurricane, which for a short time may require a large increase in plant facilities.

Considering first estimates for the whole area, the following relationships are found. Production estimates indicate an annual growth of merchantable timber of about 5 million board feet. Typical annual cut by wood-using industries in the area has been about 6 million board feet in recent years. Therefore, the rate of cut in the area exceeds the rate of growth of merchantable timber by about 1 million board feet. In considering these estimates it should be emphasized that we are dealing only with timber at present of merchantable size and not with the total growing stock in the area. It must also be kept in mind that our data refer to a period intermediate in length (2-25 years).

In Table 10 the data have been classified according to the quantity of each species. This classification shows that although the annual cut of both pine and softwood has exceeded the annual growth in recent years,

TABLE 10.—*Comparison of annual growth and typical annual cut of merchantable timber by mills operating within the area, by types*

Type	Annual Growth	Annual cut by mills operating in area			Amt. by which total cut exceeds growth
		Stationary	Portable	Total	
	M bd. ft.	M bd. ft.	M bd. ft.	M bd. ft.	M bd. ft.
Pine	2,308	1,570	1,950	3,520	1,212
Other softwood	1,687	1,475	425	1,900	213
Hardwood	1,111	450	175	625	−486
Total	5,106	3,495	2,550	6,045	939

[1]Chapman, H. H., Forest Management, p. 264, 1931.

A well-equipped permanent sawmill and wood-working plant.

the reverse is true for hardwood, because importation from outside sources displaces some of the local supply. Paper birch, however, furnishes the raw material necessary for several turning industries and represents over 20 per cent of the total cut of hardwood. Several times the amount used annually at present is becoming available for this species.

The desire for good quality raw material is universal. But certain of the industries are able to utilize logs of fair quality, while others find this grade unsatisfactory regardless of the price at which it is offered. The data in Table 4 suggest that there will be more than enough good quality raw material to satisfy the requirements of certain industries.

So far in this discussion both stationary and portable mills now operating in the area have been included. If stationary mills are considered alone, the situation is somewhat different. It appears that production is ample to continue furnishing those industries of a more or less permanent nature with the amount they now draw from the area.

At the same time there is a large potential outlet for hardwood which is now being satisfied by supplies from outside sources. One plant alone could use about 2 million board feet yearly in place of the small quantity it now purchases if a supply of the proper quality were available.

No comparison has yet been made between production and effective plant capacity. Even though capacity is estimated on a very conservative basis, it is far in excess of the available cut on a sustained yield basis and it gives little information on the actual or potential market in the area. This discussion of capacity is incomplete unless some mention is made of the period of time over which the estimates are made. In an earlier section it was pointed out that there is an intermediate period during which production cannot be greatly influenced by management practices. During this period the plant capacity will certainly be far in excess of the amount of timber that will become available. Over a much longer period it is conceivable that proper management might greatly in-

crease the quantity and an approach to these capacity figures would be made.

Setting aside for the present any possible improvement in the efficiency of processing, it appears that during the intermediate time period considered, except for some specialty products, the area is well supplied with wood-using industries. These industries have ample capacity to take care of a normal production.

Possibilities for the Future

Leaving the analysis of present conditions, we will consider possible future developments which may affect the marketing and production of forest products in this part of Carroll County.

Optimum Organization of Plants

Theoretically there should be an optimum set-up which would reduce the total cost of assembling and processing forest products to the minimum. Problems involved in achieving this objective would be closely akin to those encountered in determining the most efficient arrangement of plants and truck routes for collecting, for example, fluid milk from an area.

Within the range in which economies of size operate to increase plant efficiency, two or more plants at the same point processing the same type of material are less efficient than one larger plant. Likewise, the location of two plants side by side may result in higher total costs than if the same two plants are some distance apart. However, to the extent that there is cross shipping by farmers between the two plants this economy may not be secured.

If accurate information were available regarding costs of operating plants of varying capacities, trucks over various distances and with various loads, and so forth, a plan of reorganization of the industries might be prepared for theoretical consideration. Lacking such information the most that can be done at this time is to indicate in a general way how the factors operate and what basic data would be needed in order to determine this optimum arrangement.

First of all, consider trucking costs from roadside to plant. Provided any trucking whatsoever has to be done, a certain minimum expense is incurred which might be called the loading and unloading cost. Consequently, a haul of two or three miles is probably possible without adding substantially to the expense. A point is soon reached, however, when increasing distance increases cost sufficiently to be a deterring factor in transporting the logs.

Consider now the expense of operating the plant. A certain minimum amount of raw material must be available in order to operate efficiently even the smallest of sawmills. Depending, therefore, on the density of production, it is necessary for a sawmill to receive logs from over an area of some size. This is true to some extent even when considering a portable sawmill where, in effect, the mill is taken to the wood instead of the wood brought to the mill, for certain costs are incurred whenever it is necessary to move the mill. Quality of finished product and transportation charges considered, the most efficient size of enterprise is con-

siderably larger than the minimum actually in operation. As a result, we find mills with capacities much above the minimum drawing their raw materials from relatively large areas and relying upon low processing costs and high-quality products to offset increased trucking expense.

The third factor to be considered is that of transporting the processed or semi-processed material from the mill to the consumer, whether he be industrial, retail, or otherwise. These transportation costs have been estimated at something like two-thirds of those of hauling an equivalent amount in the form of round logs and this relationship remains constant regardless of length of haul. However, as distance increases, the absolute difference between the two sets of costs rises, making it increasingly profitable to transport the product in the form of lumber.

When the total of these three costs is at a minimum, then the most efficient setup will be reached.

Courtesy of White Mountain National Forest.

A mill, located near the area, which handles specialty products.

Such an arrangement would have plants distributed throughout the area with regard to sources of supply and markets for finished products. Two or more plants processing similar products would not be located side by side. In this respect, present stationary mills appear well distributed. There is, however, much inefficiency in the area in assembling sawlogs from farms. This is not because of excessive trucking rates, but because of selling to other than the nearest mill.

To the extent that some of the mills are poorly equipped and inefficiently set up, optimum processing conditions are not attained.

Income Possibilities from This Woodland Area

This study is primarily concerned with farmers' income from woodland. If by some change in the market organization or by other measures this income can be increased, that change would appear justified. Several complications in the method of pricing forest products enter when an attempt is made to measure farm income from this source. First,

there is the problem of whether or not attention should be focused upon stumpage prices or upon prices which farmers receive wherever they dispose of the logs.

If a farmer chooses to raise corn and feed it to his cattle rather than sell the corn as grain, then the income he receives when he sells the cattle is the income in which we are interested. Similarly, when dealing with woodland products, if the farmer chooses to cut his own timber and deliver it in his own truck to the mill, then the income he receives is based upon the mill price less the out-of-pocket costs of taking it out of the woods. Consequently, we take the situation as it now is with some farmers selling their wood on the stump, others getting it out of the woods and selling it at the side of the road, and still others taking it as far as the mill. If we add the income from all of these different methods of sale, we can get a measure of the total farm income from wood in that area. In 1929 it approximated $30,000.[1]

Our problem is to increase this sum of money. With existing market outlets an increase in income could be obtained by more efficient disposal of particular species, such a white ash, which comprise a small part of any stand. At present such species are seldom separated from those of lesser value and consequently bring little or no premium over the bulk of the logs sold. By actual assembling, or by selling through a central agency without physical concentration, small quantities now in the hands of individuals could be made to yield returns more commensurate with their actual worth.

Income might also be increased if producers would carry on more of the logging and trucking operations themselves. Where equipment and man-power are available, it is frequently possible to use it at a time of the year when other farm work is light. Still another source of possible increased income would be from an improvement in bargaining power which might put the individual producer and the wood-using plant more nearly in a position of equality. In the following discussion of the possibility of forming a cooperative, this matter of bargaining advantage will be treated.

Another opportunity for increasing income from farm woodland would be to make the transportation of these products from the farm to the plant more efficient. This would include the elimination of much of the cross shipping now being done. Whether transportation rates could be lower is a question. At the present time it appears that many of the operators transporting forest products in this section are charging such low rates that they are operating at a loss.

If it is assumed that the most efficient market outlets, considering both quality and quantity as well as location and transportation, are established in the area, what saving could be made? An accurate answer to this question cannot be given because of the difficulty of securing adequate data regarding such adjustment. One factor of considerable importance is that with efficient processing much of the raw material now being improperly processed in inefficient mills might be placed in a higher grade and return a higher price.

It also seems probable that with a smaller number of mills of a more efficient character, costs of operating would be spread over a larger

[1]Adapted from 1930 Agricultural Census estimate of value of forest products sold.

volume with consequent reduction in charges. Such reduction would benefit both those who sell their lumber at the mill and those who have it processed on a custom basis. Other reductions in cost would come because of improvement in collection and transportation. Some of these, however, might be offset by the necessity of hauling longer distances with fewer plants in the area.

All told, the possibilities of increasing income by increasing the efficiency of the market structure seem to be considerable, though possibly not as large as those opportunities offered by assembling whole lots of particular products and marketing all products to better advantage with consequent increase in bargaining power on the part of producers. Were all these factors to be added together, there would be a substantial increase in the possible returns from marketing forest products by farmers in the Carroll county area.

Up to this point, increasing farm incomes from the marketing standpoint has been discussed. Perhaps of equal importance are changes in production methods. The nature of the crop, however, makes it impossible to realize any appreciable increase in revenue from this source except over a long period of time.

The present farm woodland of the area has a fairly good distribution of age classes, although there is some shortage in the middle age groups. It lends itself readily to the type of management that should give the greatest return over a period of years. Here several methods of increasing future income suggest themselves. The first has to do with the merchantable acreage. In order to insure continued productivity and the maximum return from the acreage, cutting practices should, insofar as market conditions permit, be improved. To accomplish this, in most cases, neither additional labor nor cash outlay would be necessary, but present labor and cash would be employed in a different manner.

In considering stands not yet merchantable because of size or quality, there are also possibilities of increasing future income. In the older of these stands, improvement cuttings could be made to remove undesirable trees which are overtopping species suitable for forming a sawtimber crop. If this woodland were allowed to grow to maturity without treatment, it would in many cases contain very little marketable material. The younger of these stands of pole size and under are now fairly well stocked with desirable species but contain a significant percentage of undesirables. Periodic treatments such as weeding and thinning would both increase growth rate and bring about a good stocking of trees of definitely superior character at maturity.

The intensity of silviculture to be practiced on these young stands and those species favored should be determined, technological factors permitting, largely by markets. When treating young stands, it will be possible to retain many desirable individual trees which will not appear in the final crop. At the time of future treatments market conditions may indicate more clearly what combination of species should make up the ultimate stand.

Increase in income, as a result of better forest practices and consequent production of higher grade material, might come from two sources. One would be from greater possible utilization of timber and the other from a larger amount of the total product going in the higher price brackets.

In the case of the latter, the increase is easily overestimated. Certain species, either because of scarcity of numbers or quality, have at present a high value. As the amount of high-quality timber increases the opportunity for obtaining a premium for it decreases.

For instance, should all the owners in this area greatly increase the quality of their product, their output would represent such a small part of the total that price would be very little affected, and they too would be assured of a greater income. If, however, we consider all of the United States, or even New England, as producing this high quality, the picture changes. Were such a large area involved, values would probably not remain as high relative to the value of other products.

Thus, increased income per acre resulting from good management practices seems more likely to come from more complete utilization of timber than from relatively high prices for the top grades of lumber.

The market for low grade products in the area is limited, making the problem of utilization of material resulting from thinnings and improvement cuttings difficult. One outlet is the farmers' fuel supply. There exists also a limited cordwood market which could be supplied provided prices were adjusted to allow for quality. If the whole woodland enterprise is considered, a part of the costs of this type of cordwood operation could properly be charged to woodland improvement from which a future return will be obtained.

Cooperative Opportunities in the Area

One reason for the study being made in this particular area and at this particular time was the interest which had been evidenced by farmers in the region in the possibilities for marketing their forest products cooperatively. In addition to the information on production and prices received over past years, a section of the questionnaire was devoted to finding out whether or not each woodland owner was in favor of the establishment of a cooperative to market forest products, and, if so, if he would follow approved cutting practices. Additional information was secured on the number of horses, oxen, or tractors which he owned in order to have some idea of his equipment for carrying on operations in the woods.

TABLE 11.—*Attitude of owners of merchantable timber toward the establishment of a cooperative, 1938*[1]

Attitude	All owners			Owners with accessible tracts and equipment		
	No.	Acreage	Quantity	No.	Acreage	Quantity
		Acres	M. bd. ft.		Acres	M. bd. ft.
Favorable	156	24,853	117,245	41	8,905	35,714
Unfavorable	13	499	3,295	2		270[2]
Indifferent	128	15,690	73,386	12	697	3,791
Total	297	41,042	193,926	55	9,602	39,775

[1]State and federal lands not included in this tabulation.
[2]Timber on land classified as poor.

In Table 11 the attitude of woodland owners toward the establishment of a cooperative is summarized. This table also shows the attitude of owners who have accessible tracts and equipment for working in the woods. The data indicate that a large proportion of the woodland containing merchantable timber is in the hands of persons favorable to a cooperative. Another fair-sized portion is controlled by those indifferent, and only a small amount is in the hands of persons definitely antagonistic to cooperation. About one-fourth of those favorable to a cooperative are equipped for woods work.

During recent years there has been considerable discussion of cooperation in the field of forestry.[1] However, cooperatives in this field are few in number and of relatively recent organization. The two which have been most prominently discussed in this part of the country are at Groveton, New Hampshire, and Cooperstown, New York.[2] Both of them are financed by federal loans, but in most of their other features they differ greatly from one another. The Groveton cooperative operates mainly as a bargaining agency, its principal product being pulpwood though in the last year sawlogs have gained in importance. The Cooperstown cooperative is an operating cooperative, and has invested large sums in the building of a plant for sawing and converting logs into finished lumber.

This study suggests that the greatest opportunities for rewards from a cooperative lie in the following fields:

First, supplying to its members market information and selling their products to the best advantage.

Second, in selling through a central agency those products which on individual farms occur in quantities too small to interest a buyer.

Third, and perhaps this might be included under number one, is that of bargaining advantage through cooperative effort. A distinction can be made, however, between bargaining advantage and opportunity for obtaining higher prices from better knowledge of markets. These are two distinct fields of cooperative effort. It seems likely that the benefit accruing from good information regarding markets would in the long run considerably outweigh that which might be obtained from any bargaining advantages a cooperative in Carroll county might have.

A fourth opportunity for a cooperative would be in the field of woodland management, where owners of small tracts might obtain advice which they would be unable to afford as individuals.

A fifth opportunity would be in the field of processing. While it is not practicable for most owners, as individuals, to attempt processing and marketing their products as lumber, a cooperative representing the entire group could conceivably do it to advantage. It is possible that

[1]Published material includes:

Aaltonen, F., Herr, C. S. and Barraclough, K. E., The Cooperative Marketing of Forest Products, Journal of Forestry 36 203, 1938.

Behre, C. Edward and Lockard, C. R., Centralized Management and Utilization Adapted to Farm Woodlands in the Northeast, February, 1937.

Hawes, A. F., Cooperative Marketing of Woodland Products, United States Department of Agriculture, Farmers' Bulletin 1100, 1920

Hicks, W. T., Economic Aspects of Cooperative Marketing of Forest Products, Journal of Forestry, v. 37, p. 392, 1939.

Moore, B., The Development of Cooperative Timber Marketing and Forestry in Great Britain, Journal of Forestry, v. 35, p. 439, 1937.

Murphy, F. T., Cooperative Timber Marketing, Journal of Forestry, v. 35, p. 448, 1937.

[2]Aaltonen, et al. opus cit

Behre, et al. opus cit.

Courtesy of White Mountain National Forest.

Delivering good quality logs to a mill pond, showing a type of equipment in common use.

certain processors might agree to contract with a cooperative to handle its output at somewhat lower rates than they would charge individual producers. Such reduction in rates would be justified on the ground of releasing the mill operator from the necessity of depending upon his own efforts to secure a constant and ample supply for his mill.

These are undoubtedly not the only opportunities for cooperative effort to aid producers in marketing their forest products. They do, however, indicate some of the methods by which income could be enhanced.

Suggested Program of Action

It is with some hesitation that this section is written. The success or failure of a particular marketing organization depends not only on such measurable factors as probable sales, prices, functions, and the like, but also to a great extent upon the personnel in charge and the attitude of those belonging to or selling through it. Notwithstanding the difficulties, it seems desirable in the light of the data here presented and conditions as they now exist, to suggest the direction in which cooperative efforts appear to have the best chance of success.

In the preceding section we have already discussed some of the broad features of cooperation as it might apply in the area. Drawing upon the experience of other forestry cooperatives, especially those at Groveton, New Hampshire, and Cooperstown, New York, we may say that: neither of these cooperatives appears to offer a pattern for the area studied in Carroll county. In the first place, there are already ample processing facilities located in the area (Fig. III), hence it would seem unnecessary to establish a new plant such as has been done in Cooperstown.

On the other hand, the bargaining feature and financing of members which comprise the main work of the Groveton cooperative do not seem as necessary in Carroll county as they are in the North Country. One reason for this is that instead of two wood-using industries there are a number in the area, and hence competitive prices are more likely to obtain in this case than in Coos county where pulpwood is sold almost entirely to one or two concerns, or not at all.

A prerequisite of any plan of cooperative action must be an estimate of the volume of forest products which that cooperative may expect to handle. By applying appropriate prices to this estimate some idea of the income which the cooperative might expect can be obtained.

In a previous section the income from forest products received by farmers in the area in 1929 was estimated at about $30,000. This figure, while it indicates the return which farmers in the area did obtain in one year, is of doubtful value in considering the organization of a cooperative. Depending upon the assumptions made, various estimates of possible income to a cooperative operating within the area can be secured. The estimate based on assumptions which seem to have most merit, indicates a total handle of about $40,000 worth of product. Other estimates, depending largely upon the stage at which the cooperative would sell the forest products, range all the way from $20,000 to over $60,000. This $60,000 estimate assumes that all woodland owners would market through the cooperative and that labor and equipment would be available at satisfactory prices so that all sales would be of logs at delivery points. This is probably a maximum figure and in actual practice it is doubtful if it would be approached. To the extent that sales were made of stumpage rather than logs at delivery points the total income of the cooperative would be lower, and conversely, if sales of finished lumber were made directly to consumers, income would be increased.

Should a cooperative be largely of a marketing type it would probably not receive support unless it could keep its operating expenses well below ten per cent of its gross sales. Applying this maximum percentage to the probable handle of a cooperative in this area, we obtain a figure of $4,000. Such an amount is probably insufficient to maintain an organization and a manager on a full time basis.

A marketing cooperative would probably find its greatest opportunities in assembling sawlogs, keeping in touch with markets and market conditions, bargaining as a unit for its members, and perhaps assisting members in forest management.

Thus far discussion has been restricted to a cooperative marketing only forest products. To the extent that a cooperative performed other functions in addition to that of marketing or assisting woodland owners to manage their timber, a greater income might be available to the organization. There is, for instance, the possibility of handling other than forest products to supplement the marketing business. Such a procedure in this area would seem to offer little opportunity for success, as production of other agricultural products is limited largely to those used on the farm or sold locally. Another opportunity might be the purchasing of farm supplies. In this connection, however, there are already efficient, well-operated cooperatives and proprietary businesses now functioning in the area and it would seem unlikely for success to follow a new organization attempting to enter this field. A third opportunity might be in financing some of the members of the cooperative in their woods work. Such a function has been carried on by the Forest Products Association, the cooperative in northern New Hampshire, with a considerable amount of success. The advisability of entering this field depends largely upon whether or not present sources of credit to producers

in the area are available and reasonable in price. This is an aspect of the cooperative into which we have not inquired in our survey.

In the light of the above discussion, it would seem advisable if the establishment of a cooperative is attempted that it activities be restricted to forest products marketing. In view of the many efficient processing plants now operating in the area, it would seem wise for such a cooperative to attempt to contract for its processing with one or more of the existing mills. Because it is doubtful if sales volume would be over $40,000 per year, expenses of management would have to be restricted to such an extent that it would not be possible to hire a full time manager. Perhaps some local resident might be able to devote a part of his time to managing the affairs of the cooperative. Under such an arrangement the directors would have to assume a large part of the responsibility for successful operation of the organization.

Experience with other cooperatives has demonstrated that in order to assure continued interest, the membership should supply a good part of the capital. Prior to the formation of an association it would be well to obtain the assistance of one of the agencies which has had long experience in the organizing and financing of cooperatives.

The potentialities of a cooperative organization of either the federated or centralized type have not been explored. By combining two or more operating units under a central management there might be a great enough volume of business to support a full-time manager and staff. However, if both production areas and markets are located as they are in Carroll county, such an organization would involve increased travel and communication expense and would probably cost more per thousand board feet than the single cooperative previously discussed. To the extent that high value products are handled the federated or centralized type of organization would have certain advantages, but in the area studied very little business would fall into that category.

While there are some exceptions there is a general tendency for cooperatives which cannot be operated successfully independently to be unsuccessful when combined.

Summary

Farm woodlands supply an important part of farm income in Carroll county, New Hampshire. Consequently, any methods by which income from forest products can be increased should be of value to farmers.

While this study is confined to a section of Carroll county, its findings are applicable to many other parts of northern New England.

Woodland acreage, in the area studied, totaled 223,000, of which approximately 52,000 acres supported merchantable timber.

Total stand of merchantable timber approximated 260 million board feet. For the next few years the annual cut on a sustained yield basis would be about five million board feet.

An analysis of the effects of various factors upon the production of merchantable timber was made. For the purposes of this study a production period termed "intermediate" of two to twenty-five years was considered of greatest significance.

Present market outlets take about six million board feet annually. Some three and a half million of this goes to more or less permanent industries and the remainder is handled by portable mills. Plant capacities bear little relation to the amounts of timber cut by particular industries. In general, effective plant capacities are far in excess of annual consumption.

Comparing the average annual cut in recent years with that estimated to be allowable on a sustained yield basis, it is found that except for hardwood the present cut exceeds the increment of merchantable timber.

Stumpage prices have ranged all the way from $1.50 per thousand board feet for low-grade or relatively less accessible hardwood to $5.00 and over for especially desirable pine and spruce.

Log prices have fluctuated considerably over the past 15 years, as shown by the series for pine logs delivered to the mill. Starting at $18 per thousand in 1924, they reached a peak of $20 in 1927 and then declined, at first gradually, then rapidly, until 1932. From this point to the present, except for a slight rise in 1937, they have remained at $10.

Transportation charges have ranged upward from $1.00 per thousand minimum, and tend to vary with distance rather than value of product. No attempt was made to determine relationship between charges and actual costs for transportation of forest products.

It appears that during the intermediate time period considered the area is well supplied with wood-using industries. These industries have capacity ample to take care of a normal production.

Farm income from the sale of woodland products was about $30,000 in 1929. This income could be increased by making more efficient the assembling operations, and adopting improved production practices.

Cooperation offers opportunities for increasing farm income from marketing forest products in the area. A large proportion of the woodland containing merchantable timber was found to be in the hands of persons favorable to cooperative effort. Another fair-sized portion was controlled by those indifferent, and only a small amount was in the hands of persons definitely antagonistic to cooperation in this field.

The directions in which cooperative effort might be most successful are in assembling sawlogs, keeping in touch with markets and market condi-

tions, bargaining as a unit for members, and perhaps assisting them in forest management. As the annual business of a cooperative which confined its activities to marketing forest products would be in the neighborhood of $40,000, operating expenses should be less than $4,000, an amount probably insufficient to maintain an organization and a manager on a full time basis. There are already ample processing facilities located in the area.

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